ONR D&I Electronics Technology Programs Report

Contract Number: N00014-06-C-0054

Performer: HRL Laboratories Contract PI: Jeong Moon

Program Period (Baseline): 2/23/06 – 12/31/08

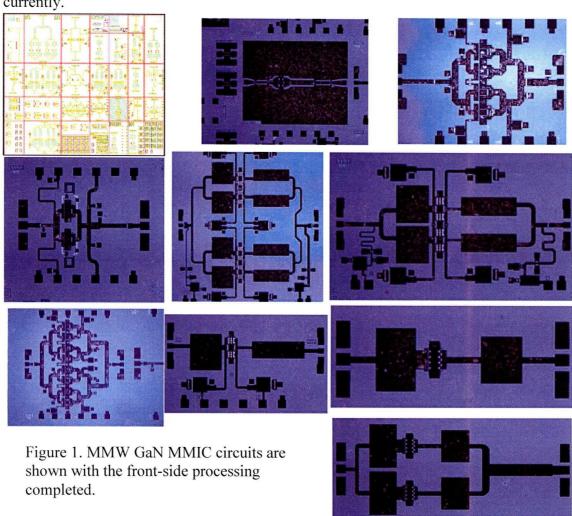
Reporting Period: Sep, 2008

Program Status:

One of the D&I program goals is to develop greatly improved field-plated MMW GaN HEMT devices with high ft/fmax, which will improve gain/PAE and output power of GaN HEMT MMIC PAs simultaneously. The 6-wafer MMW GaN MMIC lot is competed with the front-side processing and waiting for the back-side processing.

Key Accomplishments or milestones:

1) Figure 1 shows optical photographs of MMW GaN MMIC circuits in the fab currently.



All the PCM devices are tested and characterized in terms of DC and RF. Table 1 shows measured $2x100 \mu m$ PCM devices after the front-side processing complete, in

maintaining the data needed, and c including suggestions for reducing	lection of information is estimated to ompleting and reviewing the collect this burden, to Washington Headqu uld be aware that notwithstanding and DMB control number.	ion of information. Send commen arters Services, Directorate for In:	ts regarding this burden estimate formation Operations and Reports	or any other aspect of the control o	his collection of information, Highway, Suite 1204, Arlington
1. REPORT DATE SEP 2008		2. REPORT TYPE		3. DATES COVE 23-02-2000	GRED 6 to 31-12-2008
4. TITLE AND SUBTITLE				5a. CONTRACT	NUMBER
ONR D&I Electron	nics Technology Pro	grams Report		5b. GRANT NUM	MBER
				5c. PROGRAM I	ELEMENT NUMBER
6. AUTHOR(S)				5d. PROJECT NU	UMBER
				5e. TASK NUMI	BER
				5f. WORK UNIT	NUMBER
	ZATION NAME(S) AND AI ,3011 Malibu Canyo	` /	A,90265-4797	8. PERFORMING REPORT NUMB	G ORGANIZATION ER
9. SPONSORING/MONITO	RING AGENCY NAME(S) A	AND ADDRESS(ES)		10. SPONSOR/M	IONITOR'S ACRONYM(S)
				11. SPONSOR/M NUMBER(S)	IONITOR'S REPORT
12. DISTRIBUTION/AVAIL Approved for publ	LABILITY STATEMENT ic release; distribut	ion unlimited			
13. SUPPLEMENTARY NO	OTES				
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFIC	ATION OF:		17. LIMITATION OF	18. NUMBER	19a. NAME OF
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	ABSTRACT Same as Report (SAR)	OF PAGES 6	RESPONSIBLE PERSON

Report Documentation Page

Form Approved OMB No. 0704-0188 comparison to those from the EEHEMT device model used for MMW GaN MMIC circuits.

Table1: Summary of GaN37 wafers in processing

Wafer	Idss/Imax (A/mm)	I_min (mA/mm) @ Vgs = - 6V	Peak gm (mS/mm)	Vpo (V)	Ft (GHz)	Status
Design Target	0.78/1.01	<0.0001*	377	-2.9	55	EEHEMT model
G544	1.01/1.16	1.2	325	-3.88	50	Backside processing
G552		-	-	-	-	Broken
G632	0.8/1.0	0.25	366	-2.4	52	Backside processing
G634	0.85/1.08	0.2	414	-2.3	55	Backside processing
G645	0.86/1.07	0.1	391	-2.5	54	Backside processing
G646	0.91/1.11	0.1	385	-2.7	53	Backside processing

- Imax is defined at Vds = 1 V at this time
- Imin was measured at Vds = 10 V and Vgs = -6 V, well below the Vpinchoff.
- Ft was measured at Vds = 10 V and Vgs at peak gm.
- *The EEHEMT model is not well established below the pinch-off voltage.
- 2) Single-stage CPW circuits are characterized in terms of gain and bandwidth, and compared with the simulation. Figure 2 shows the comparison plot. The bandwidth is wider than that of simulated. It is attributed to a change in the input match. With the backside processing complete, we will have more results to compare with.

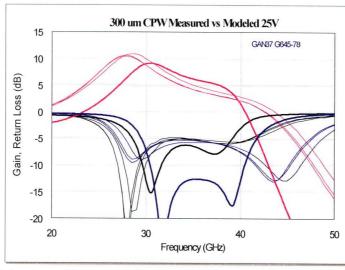
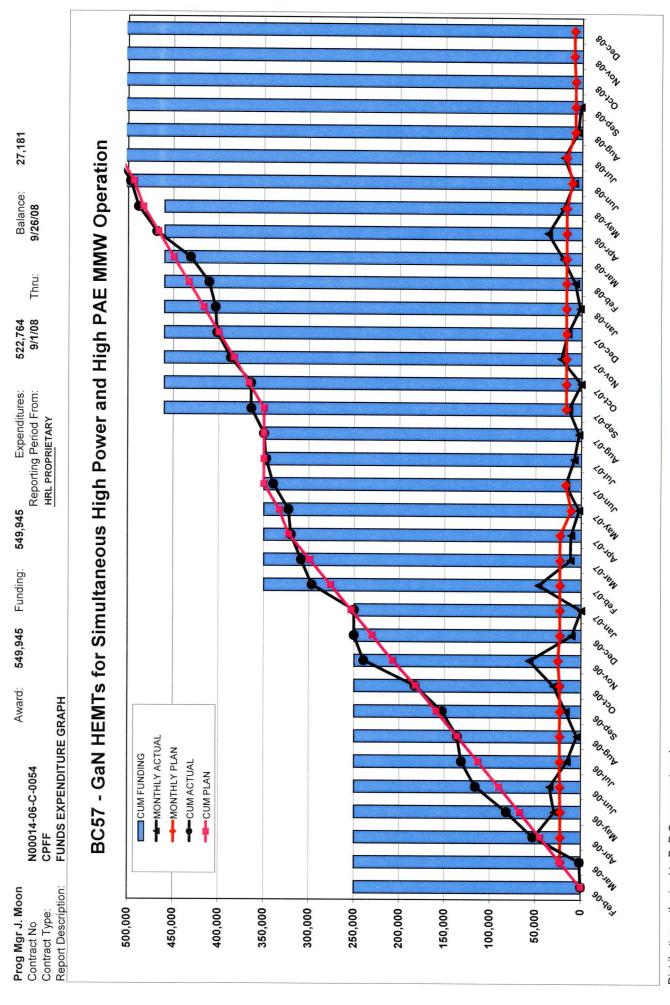


Figure 2. Measured (thin lines) and simulated (thick lines) s-parameters of the single-stage CPW MMICs are shown with 25 Vds and 200 mA/mm. The gain and bandwidth are not sensitive to Vds over Vds = 20 – 28 V, and Ids = 200 -70 mA/mm.

Objectives for next month:

1) Complete the MMW GaN MMIC lot.

Budget summary: The available funding to be spent would be \sim \$60 K with a fee in the contract, which has a total funded amount of \$550 K.



Distribution authorized to DoD Components only.

Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

Countact	Copper C							DAL PROPRIETART	RIEIARI			
Find & Labort Hour Report Finding Reporting Period of Performance 223:06 Thru 1231:08 Thru 1231:0	Monthly Reporting Period From: 9/1/08 Thru: 9/2/108 S & Labor Hour Period of Performance: 2/2306 Thru: 1/23/108 Report C D E E Report C D E E Period of Performance: C D E Report C D E E Period of Performance: C D E E Period of Performance: C D E E Period of C C D E E Period of C C D E E Period of C C D E E Amount DOLLAR MAN DOLLAR MAN DOLLAR Amount HOURS VALUE HOURS VALUE HOURS VALUE Amount HOURS VALUE HOURS VALUE HOURS VALUE 1,236 B 464 770 <th>Contract No</th> <th>N00014-06-C-00</th> <th></th> <th>Thru Mod:</th> <th></th> <th></th> <th>Preparation Date:</th> <th></th> <th>10/6/08</th> <th></th> <th></th>	Contract No	N00014-06-C-00		Thru Mod:			Preparation Date:		10/6/08		
Figure Finds & Labor Hour Period of Performance Fixponditure Fixponditu	S. Labor Hour Period of Periomance: 2/23/06 Thru. 12/31/08 Xependiture Funding: \$ 549,945 Thru. 12/31/08 Report C D D E COTIATED REPORTING PERIOD CUMULATIVE ESTIMATE AT INTEREST COMPLETION B2 C1 C2 D1 D2 E1 E B2 C1 C2 D1 D2 E1 E0 B2 C1 C2 D1 D2 E1 E0 B2 C1 C2 D1 D2 E1 E0 B0LLAR MAN DOLLAR MAN MAN DOLLAR VAILUE HOURS VAILUE LO	Contract Type:	CPFF			Monthly		Reporting Period F	rom:	9/1/08	Thru:	9/26/08
Rightant Report	Report Funding: \$ 549.945 Report C D E E CITATED C D E E CHANGES EXPENDITURES COMPLETION COMPLETION CHANGES EXPENDITURES COMPLETION COMPLETION HANGES EXPENDITURES COMPLETION COMPLETION BZ CT CT DZ ET ET BOLLAR MAN DOLLAR AVA TA AVA	HRL Ref#: 05031			Fun	ds & Labor Ho		Period of Performs	ance:	2/23/06	Thru:	12/31/08
Report R	COMPLETON COMPLETON COMPLETON ESTIMATE AT COMPLETON COMP	BC57				Expenditure		Funding:				
COUNTRACT COUN	Complete					Report						
CONTRINCT CONTRICT	Completed Comp			A		8		O		0		Ш
CONTRACT CHANGES EXPENDITURES COMPLETION	Bay		ORIGINAL	IEGOTIATED	LATEST NE	GOTIATED	REPORTII	NG PERIOD	COMUL	-ATIVE	ESTIN	NATE AT
A1 A2 B1 B2 C1 C2 D1 D2 E1 E MAN DOLLAR MAN </th <th>B2 C1 C2 D1 D2 E1 E DOLLAR MAN DOLLAR MAN DOLLAR MAN DOLLAR MAN AMCUNT HOURS VALUE HOURS VALUE HOURS VALUE 1,286 0 0 421 27,012 42 VALUE 1,126 0 0 421 27,012 42 VALUE 15,486 1 27 739 43,262 885 885 15,486 8 464 770 30,697 1,027 0 15,00 0 0 44 770 30,697 1,027 15,00 0 0 44 770 30,697 1,027 13,00 0 0 0 44 111 0 22,136 35 137,980 1,806 1,806 346,547 3,759 14,943 44,944 16,224 1,806 1,804 1,804</th> <th></th> <th>CONI</th> <th>RACT</th> <th>CONTRACT</th> <th>CHANGES</th> <th>EXPEN</th> <th>DITURES</th> <th>EXPEND</th> <th>ITURES</th> <th>COMF</th> <th>LETION</th>	B2 C1 C2 D1 D2 E1 E DOLLAR MAN DOLLAR MAN DOLLAR MAN DOLLAR MAN AMCUNT HOURS VALUE HOURS VALUE HOURS VALUE 1,286 0 0 421 27,012 42 VALUE 1,126 0 0 421 27,012 42 VALUE 15,486 1 27 739 43,262 885 885 15,486 8 464 770 30,697 1,027 0 15,00 0 0 44 770 30,697 1,027 15,00 0 0 44 770 30,697 1,027 13,00 0 0 0 44 111 0 22,136 35 137,980 1,806 1,806 346,547 3,759 14,943 44,944 16,224 1,806 1,804 1,804		CONI	RACT	CONTRACT	CHANGES	EXPEN	DITURES	EXPEND	ITURES	COMF	LETION
MAN DOLLAR HOURS VALUE AZ TAZ	DOLLAR MAN DOLLAR AQL AQL <t< th=""><th></th><th>A1</th><th>A2</th><th>B4</th><th>B2</th><th>ပ</th><th>C2</th><th>D1</th><th>D2</th><th>E1</th><th>E2</th></t<>		A1	A2	B 4	B2	ပ	C2	D1	D2	E1	E2
Columbia	1,286		MAN	DOLLAR	MAN	DOLLAR	MAN	DOLLAR	MAN	DOLLAR	MAN	DOLLAR
27 2,239 15 1,286 0 0 421 27,012 42 466 29,550 419 25,865 1 27 739 43,222 885 666 29,550 174 9,682 0 0 131 6,686 840 666 24,896 15,486 0 0 4 111 0 0 0 0 0 444 770 30,697 1,027 0 0 0 0 0 444 770 30,697 1,027 0 0 0 0 0 444 770 30,697 1,027 0 0 0 0 0 0 358 0 358 0 1,827 85,161 1,103 2,128 1,134 3,140 1,134 3,146 3,146 4,134 3,146 4,134 3,146 4,146 3,146 4,146 3,146 4,146	1,286 0 0 421 27,012 42 25,865 1 27 739 43,262 885 9,682 0 0 131 6,658 840 15,436 8 464 770 30,697 1,027 0 0 0 0 4 1,1027 550 0 0 6,688 840 65,819 0 0 54 2,687 35 137,980 491 2,128 110,785 2,829 1 137,980 1,806 346,547 3 163,462 1,806 346,547 3 163,462 1,806 346,547 3 16,822 200 3,759 6 16,822 200 47,661 4 4,374 1,806 420,227 4 15,324 1,804 1,804 522,764 5 199,982 1,804 1,804 522,764		פאסטר	AMOON	HOOKS	AMOON	HOUKS	VALUE	HOURS	VALUE	HOURS	VALUE
466 29,550 419 25,665 1 27 739 43,262 885 666 35,400 174 9,682 0 0 131 6,688 840 645 24,896 382 15,436 8 464 770 30,697 1,027 23 1,022 12 560 0 0 4 111 0 23 1,022 12 52,819 0 0 54 2,687 35 0 0 0 0 0 356 0 0 1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 1 1,827 85,161 1,103 2,128 11,300 22,362 2 2 1,824 1,864 25,482 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <td>25,865 1 27 739 43,262 885 9,682 0 0 131 6,658 840 15,436 8 464 770 30,697 1,027 0 0 0 4 111 0 550 0 0 9 358 0 0 0 9 358 0 137,980 1,103 2,128 110,785 2,829 1 137,980 1,806 346,547 3 261 163,462 1,806 420,227 4 16,822 200 3,759 0 16,822 200 47,661 47,661 4,374 373 482,831 5 15,324 1,804 522,764 5 199,982 1,804 1,804 522,764 5</td> <td>SMTS2</td> <td>27</td> <td>2,239</td> <td>15</td> <td>1,286</td> <td>0</td> <td>0</td> <td>421</td> <td>27.012</td> <td>42</td> <td>3.525</td>	25,865 1 27 739 43,262 885 9,682 0 0 131 6,658 840 15,436 8 464 770 30,697 1,027 0 0 0 4 111 0 550 0 0 9 358 0 0 0 9 358 0 137,980 1,103 2,128 110,785 2,829 1 137,980 1,806 346,547 3 261 163,462 1,806 420,227 4 16,822 200 3,759 0 16,822 200 47,661 47,661 4,374 373 482,831 5 15,324 1,804 522,764 5 199,982 1,804 1,804 522,764 5	SMTS2	27	2,239	15	1,286	0	0	421	27.012	42	3.525
666 35,400 174 9,682 0 0 131 6,656 840 045 24,996 382 15,436 8 464 770 30,697 1,027 0 0 0 0 0 0 36,687 35 0 0 0 0 0 0 36,687 35 1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 1 1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 1 1,827 93,107 1,37,980 1,806 1,806 346,547 3 1,864 1,864 1,806 3,759 2,619 3,759 2,619 1,864 1,804 1,804 1,804 1,804 420,227 4 2,84,719 16,822 1,804 1,804 1,804 1,804 1,804 1,804 1,804 1,80	9,682 0 0 131 6,658 840 15,436 8 464 770 30,697 1,027 0 0 0 4 111 0 550 0 0 9 36,87 35 52,819 9 491 2,128 110,785 2,829 1 137,980 1,806 212 22,362 2 2 2 137,980 1,806 0 346,547 3 3 3 3 4 16,822 20 0 346,547 3 4 <td< td=""><td>SMTS1</td><td>466</td><td>29,550</td><td>419</td><td>25,865</td><td>-</td><td>27</td><td>739</td><td>43,262</td><td>885</td><td>55,415</td></td<>	SMTS1	466	29,550	419	25,865	-	27	739	43,262	885	55,415
645 24,896 382 15,436 8 464 770 30,697 1,027 23 1,022 12 550 0 0 54 2,687 35 0 0 0 0 9 358 0 1,022 1,022 12 2,687 35 0 1,827 93,107 1,002 52,819 9 491 2,128 110,765 2,829 1 1,827 93,107 1,002 52,819 9 491 2,128 110,765 2,829 1 1,827 2,8491 9 4,91 2,128 110,765 2,829 1 1,824,491 1,864 25,482 0 0 3,759 0 3,759 1,864 2,5482 1,806 420,227 4 4,374 4,374 4,374 4,374 4,374 4,374 1,633 482,831 5 2,6,753 1,804 1,804 1,804	15,436 8 464 770 30,697 1,027 0 0 0 4 111 0 550 0 0 54 2,687 35 60 0 0 9 358 0 60 0 0 358 0 0 85,161 1,103 21,2 22,362 2 85,161 1,103 213,400 2 2 137,980 1,806 3759 3 3 163,462 0 0 3,759 4 16,822 200 47,661 4 4 16,822 200 47,661 4 4 16,824 373 14,943 5 5 15,324 1,804 522,764 5 5	MTS	999	35,400	174	9,682	0	0	131	6,658	840	45,082
0 0 0 4 111 0 23 1,022 12 550 0 0 54 2,687 35 1 0 0 0 0 0 52,819 0 0 358 0 1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 145 245,491 137,980 1,103 2,128 13,402 23,362 2,336 2,336 2,336 2,336 2,336 2,336 1,45 3,36 2,378 2,378 1,45 3,378 1,46 2,48 2,48 2,48 2,48 2,48 2,48 2,48 2,48 2,48 1,48 2,37 3,38	0 0 4 111 0 550 0 0 54 2,687 35 1 52,819 9 491 2,128 110,785 2,829 145 85,161 1,103 212 22,362 237 137,980 1,806 346,547 383 163,462 0 69,660 62 16,822 200 420,227 448 16,822 200 420,227 448 16,822 200 420,227 448 15,324 1,806 420,227 448 15,324 1,804 522,764 522,764	7	645	24,896	382	15,436	80	464	770	30,697	1,027	40,332
23 1,022 12 550 0 0 54 2,687 35 1 1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 145 1,827 85,167 1,102 212 22,362 2,829 145 245,491 137,980 1,806 346,547 283 37,364 25,482 0 69,660 62 1,864 1,804 0 8,654 448 284,719 16,822 1,806 420,227 448 30,025 1,822 200 47,661 46,46 349,963 15,324 1,804 420,227 448 323,210 184,658 1,804 522,764 549 349,963 199,982 1,804 522,764 549	550 0 0 54 2,687 35 1 52,819 0 0 9 358 0 52,819 9 491 2,128 110,785 2,829 145 85,161 1,103 21,22 213,400 237 237 137,980 1,806 346,547 383 163,462 0 69,660 62 0 3,759 1 16,822 0 420,227 448 16,822 1,806 420,227 448 16,824 373 14,943 12 184,658 1,633 482,831 507 15,324 1,804 522,764 529,764 199,982 1,804 1,804 522,764 549,93	GE	0	0	0	0	0	0	4	111	0	0
0 0 0 9 358 0 1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 145 245,491 137,980 1,806 212 22,362 237 37,364 25,482 0 69,660 62 1,864 25,482 0 37,59 448 1,864 1,864 69,660 62 1,864 1,864 1,806 420,227 448 30,025 163,462 1,806 420,227 446 8,466 4,374 373 482,831 10,443 32,3,210 18,468 1,633 1,804 522,764 42,607 349,963 19,982 1,804 522,764 549 549	52,819 9 491 2,128 110,785 2,829 145 85,161 1,103 212 22,362 237 137,980 1,806 346,547 237 16,822 0 3,759 1 16,822 200 3,759 1 16,822 200 47,661 46 4,374 1,806 420,227 448 15,324 1,633 482,831 507,12 15,324 1,804 522,764 549 199,982 1,804 522,764 549	CA	23	1,022	12	220	0	0	54	2,687	35	1,572
1,827 93,107 1,002 52,819 9 491 2,128 110,785 2,829 2 152,384 85,161 1,103 21,2 22,362 3 2 2 3 2 2 3 4 2 2 3 4 3 4 3 4 3 4 3 4	52,819 9 491 2,128 110,785 2,829 7 85,161 1,103 21,2362 2 2 137,980 1,806 0 69,660 3,759 25,482 0 0 3,759 16,822 200 4,20,227 4 4,374 1,806 420,227 4 4,374 1,633 482,831 5 15,324 1,804 522,764 5 199,982 1,804 522,764 5	ЬА	0	0			0	0	O	358	0	0
152,384 85,161 212 22,362 2 245,491 137,980 1,806 346,547 3 37,364 25,482 0 69,660 3,759 0 69,660 3,759 4 284,719 16,822 200 4,262 4 30,025 4,374 373 14,943 5 8,466 4,374 16,822 200 47,661 4 8,466 4,374 16,324 1,633 482,831 5 26,753 15,324 1,804 522,764 5 199,963 199,982 1,804 522,764 5	85,161 212 22,362 2 137,980 1,806 346,547 3 25,482 0 69,660 3,759 0 0 261 4 16,822 200 47,661 4 4,374 1,806 420,227 4 15,324 1,633 482,831 5 15,324 171 39,933 5 199,982 1,804 522,764 5 0 0 0 0 199,982 1,804 522,764 5	Total Hours & Dollars	1,827	93,107	1,002	52,819	6	491	2,128	110,785	2,829	145,926
152,384 85,161 1,103 213,400 2 245,491 137,980 1,806 346,547 3 1,864 25,482 0 3,759 0 3,759 261 4 284,719 163,462 1,806 420,227 4 8,466 4,374 200 47,661 5 8,466 4,374 16,822 200 47,661 5 26,753 184,658 1,633 482,831 5 26,753 15,324 171 39,933 5 199,983 1,804 522,764 5 0 0 0 0	85,161 1,103 213,400 137,980 1,806 346,547 25,482 0 3,759 0 261 163,462 1,806 420,227 4,374 200 47,661 4,374 1,633 482,831 5 15,324 1,804 522,764 5 199,982 1,804 522,764 5	LAB ALLOCATION						212		22.362		
245,491 137,980 1,806 346,547 3 1,864 0 0 3,759 0 0 3,759 0 261 261 284,719 163,462 200 47,661 4 30,025 4,374 200 47,661 4 8,466 4,374 1,833 482,831 5 26,753 184,658 1,633 482,831 5 26,753 15,324 171 39,933 5 26,753 199,982 1,804 522,764 5 1,804 522,764 5 6	137,980 1,806 346,547 3 25,482 0 69,660 0 3,759 0 261 163,462 200 420,227 16,822 200 47,661 4,374 373 14,943 184,658 1,633 482,831 5 15,324 1,804 522,764 5 199,982 1,804 522,764 5	OVERHEAD		152,384		85,161		1,103		213,400		237,545
37,364 25,482 0 69,660 1,864 0 3,759 0 0 3,759 284,719 16,822 200 47,661 8,466 4,374 14,943 5482,831 5482,831 26,753 15,324 171 33,933 552,764 50 349,963 199,982 1,804 522,764 5 0 0 0 0 0	25,482 0 69,660 0 3,759 163,462 1,806 420,227 4,374 200 47,661 4,374 373 14,943 184,658 1,633 482,831 5 15,324 1,804 522,764 5 199,982 1,804 522,764 5	TOTAL LABOR & O/H		245,491		137,980		1,806		346,547		383,471
37,364 25,482 0 69,660 1,864 0 3,759 0 3,759 284,719 163,462 1,806 420,227 4 8,466 4,374 373 14,943 5 26,753 16,324 1,633 482,831 5 349,963 199,982 1,804 522,764 5 1,804 522,764 5 5	25,482 0 69,660 0 3,759 163,462 1,806 420,227 4,374 200 47,661 4,374 373 14,943 184,658 1,633 482,831 5 15,324 1,804 522,764 5 199,982 1,804 522,764 5											
1,864 0 3,759 0 0 261 284,719 16,822 200 47,661 44 30,025 4,374 200 47,661 44 8,466 4,374 373 14,943 1 26,753 15,324 1,633 482,831 50 349,963 199,982 1,804 522,764 54 0 0 0 0 0	163,462 1,806 420,227 44 16,822 200 47,661 4 4,374 373 14,943 1 184,658 1,633 482,831 50 15,324 1,804 522,764 54 199,982 1,804 522,764 54	MATS & PARTS		37,364		25,482		0		099'69		62,846
284,719 163,462 1,806 420,227 4 30,025 16,822 200 47,661 4 8,466 4,374 373 14,943 5 323,210 184,658 1,633 482,831 5 26,753 15,324 1,71 39,933 5 349,963 199,982 1,804 522,764 5 1,804 522,764 5 6	163,462 1,806 420,227 4 16,822 200 47,661 4 4,374 373 14,943 5 184,658 1,633 482,831 5 199,982 1,804 522,764 5 1,804 522,764 5	TRAVEL EXPENSES		1,864				0		3,759		1,864
284,719 163,462 1,806 420,227 4 30,025 4,374 200 47,661 6 8,466 4,374 373 14,943 5 26,753 184,658 1,633 482,831 5 15,324 171 39,933 5 349,963 199,982 1,804 522,764 5 1,804 522,764 0	163,462 1,806 420,227 4 16,822 200 47,661 4,374 373 14,943 184,658 1,633 482,831 5 15,324 1,71 39,933 5 199,982 1,804 522,764 5 1,804 522,764 5	ODC,SUB		0				0		261		0
30,025 16,822 200 47,661 8,466 4,374 373 14,943 323,210 184,658 1,633 482,831 5 26,753 15,324 171 39,933 5 349,963 199,982 1,804 522,764 5 1,804 522,764 5 5	16,822 200 47,661 4,374 373 14,943 184,658 1,633 482,831 5 15,324 171 39,933 5 199,982 1,804 522,764 5 1,804 522,764 5	SUB-TOTAL COSTS		284,719		163,462		1.806		420.227		448 181
8,466 4,374 373 14,943 323,210 184,658 1,633 482,831 5 26,753 15,324 171 39,933 5 349,963 199,982 1,804 522,764 5 0 0 0 1,804 522,764 5	4,374 373 14,943 184,658 1,633 482,831 5 15,324 171 39,933 5 199,982 1,804 522,764 5 1,804 522,764 5	G&A		30,025		16,822		200		47,661		46.847
323,210 184,658 1,633 482,831 5 26,753 15,324 171 39,933 349,963 199,982 1,804 522,764 5 1,804 522,764 5	184,658 1,633 482,831 5 15,324 171 39,933 199,982 1,804 522,764 5 1,804 522,764 5	COST OF MONEY		8,466		4,374		373		14,943		12,840
26,753 15,324 171 39,933 349,963 199,982 1,804 522,764 0 0 1,804 522,764	15,324 171 39,933 199,982 1,804 522,764 0 0 1,804 522,764	TOTAL COST		323,210		184,658		1,633		482.831		507,868
349,963 1,804 522,764 0 0 1,804 522,764	199,982 1,804 522,764 0 0 1,804 522,764	FEE / PROFIT @ 8.5%		26,753		15,324		171		39,933		42,077
1,804 522,764	1,804 522,764	TOTAL CPFF		349,963		199,982		1,804		522,764		549.945
1,804	1,804	P.O. Commitments								0		
		TOTAL COMM & EXP						1,804		522,764		
	Destroy by any mathod that will account afford that discontinue of the desirent	Distribution authorized to DoD C	omponents only.									

Dollars											HRL	HRL PROPRIETARY	ARY			
MONTH	Feb-06	Mar-06	Feb-06 Mar-06 Apr-06 May-06	May-06	Jun-06		Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Jul-06 Aug-06 Sep-06 Oct-06 Nov-06 Dec-06 Jan-07 Feb-07 Mar-07 Apr-07 May-07	Mar-07	Apr-07	Mav-07
MONTHLY PLAN	-	22,315	22,356	22,333	22,977	23,001	23,061	22,924	23,038	25,183	23,014	22,983	23,024	23,019	22,956	10,808
CUM PLAN	ı	22,315	44,671	67,004	89,981	112,982	136,043	158,967	182,005	207,188	230,202	253,185	112,982 136,043 158,967 182,005 207,188 230,202 253,185 276,209	299,228	322,184	332.992
MONTHLY ACTU	1	1,432	1,432 51,215 29,132	29,132	34,270	4,270 15,422	4,525	16,603	30,176	56,791	10,489	10	46.797	11.952	11.251	2.474
CUM ACTUAL	-	1,432	52,647	81,779	116,049	131,471	135,996	152,599	182,775	239,566	250,055	250,055	116,049 131,471 135,996 152,599 182,775 239,566 250,055 250,055 296,852	308,804	1 (,)	322,529
CUM FUNDING	249,963	249,963	249,963 249,96	249,963	249.963	249.963	249.963	249.963	249 963	249 963	249 963	249 963	349 963	340 063	340 063	340 063

ep-0(Feb-06 Mar-06		Apr-06 May-06	90-unf	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	Mav-07
٦	120	121	120	120	120	121	120	121	120	120	120	120	120	120	61
٦	120	241	361	481	601	722	842	963	1083	1203	1323	1443	1563	1683	1744
٥	8	134	169	179	35	26	86	160	312	51	101	111	71	62	00
J	8	142	311	490	525	551	649	809	1121	1172	1273	1384	1455	1517	1525